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**Title:** JP11307081A2: LITHIUM ION SECONDARY BATTERY AND ITS MANUFACTURE

**Country:** JP Japan

**Kind:** A2 Document Laid open to Public inspection I

**Inventor:** MAEDA KENICHI;

**Assignee:** SHIN KOBE ELECTRIC MACH CO LTD  
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**Priority Number:** 1998-04-17 JP19981998107775


**Abstract:** PROBLEM TO BE SOLVED: To suppress the deterioration of capacity and decrease the number of charge/discharge cycles of a battery by adding phosphoric ester as a surface active agent to at least one of a positive electrode material layer mainly comprising a lithium-containing composite oxide and a negative electrode material layer mainly comprising a carbon material.

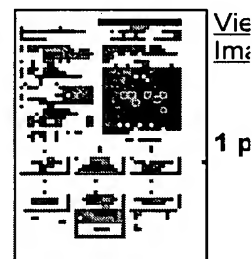
SOLUTION: Phosphoric ester acting as a surface active agent is added to at least one of a positive electrode material layer and a negative electrode material layer of a lithium ion secondary battery in which the positive electrode material layer mainly comprising a lithium-containing composite oxide (lithium cobaltate) and the negative electrode material layer mainly comprising a carbon material (graphite) absorbing/releasing lithium ions are stacked through a nonaqueous electrolyte layer. As the phosphoric ester, triphenyl phosphate or tricresyl phosphate is used and the adding amount is 2-20 wt.% based on the weight of the lithium-containing composite oxide or the carbon material. The phosphoric ester is eluted on the electrode surface, forms the unevenness on the electrode surface, and sufficiently heightens the wettability on the electrode surface.

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**Family:** None

**Forward References:** **Go to Result Set:** [Forward references \(1\)](#)

PDF	Patent	Pub.Date	Inventor	Assignee	Title
	<a href="#">US6586912</a>	2003-07-01	Tsakamoto;	Quallion	<a href="#">Method and apparatus for amplitude</a>

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**PATENT ABSTRACTS OF JAPAN**(21) Application number: **10107775**(51) Intl. Cl.: **H01M 4/02** H01M 4/04 H01M 4/62  
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(43) Date of application publication: <b>05.11.99</b>	(72) Inventor: <b>MAEDA KENICHI</b>
(84) Designated contracting states:	(74) Representative:

**(54) LITHIUM ION  
SECONDARY BATTERY AND  
ITS MANUFACTURE**

(57) Abstract:

**PROBLEM TO BE SOLVED:** To suppress the deterioration of capacity and decrease the number of charge/discharge cycles of a battery by adding phosphoric ester as a surface active agent to at least one of a positive electrode material layer mainly comprising a lithium-containing composite oxide and a negative electrode material layer mainly comprising a carbon material.

**SOLUTION:** Phosphoric ester acting as a surface active agent is added to at least one of a positive electrode material layer and a negative electrode material layer of a lithium ion secondary battery in which the positive electrode material layer mainly comprising a lithium-containing composite oxide (lithium cobaltate) and the negative electrode material

layer mainly comprising a carbon material (graphite) absorbing/releasing lithium ions are stacked through a nonaqueous electrolyte layer. As the phosphoric ester, triphenyl phosphate or tricresyl phosphate is used and the adding amount is 2-20 wt.% based on the weight of the lithium-containing composite oxide or the carbon material. The phosphoric ester is eluted on the electrode surface, forms the unevenness on the electrode surface, and sufficiently heightens the wettability on the electrode surface.

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